

Review Tracking Report

Review #:2007-001

Program: Accelerator Systems Advisory Committee (ASAC)

Date Performed: 4/23/2007

Date Closed:

Comments: Next meeting scheduled for October 8 and 9, 2007.

Finding #: F01	Priority:	Status: Closed	Scheduled Close: 10/8/2007	Actual Close: 10/7/2007
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Description: The committee wishes to be presented, at the next meeting, an overall schedule of the project, highlighting the links or conflicts between the building program, the accelerator program and the beamline program.

Owner: Steve Dierker

Action: Provide detailed schedule, highlighting the links or conflicts between the building program, the accelerator program and the beamline program.

Response: A detailed schedule will be provided at the next meeting.

Finding #: F02	Priority:	Status: Closed	Scheduled Close: 10/8/2007	Actual Close: 10/7/2007
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Description: Concerning the revised building program, the committee understands the need of saving money on building infrastructure but recall the importance of keeping the offices of accelerator staff (machine physicists, RF, Diagnostics,...) as close as possible to the NSLS-II control room to maximize their interaction with the operation crew.

Owner: Steve Dierker

Action: Consider option for 3rd floor on Operations Center with offices.

Response: The preliminary design drawings contain an optional 3rd floor on the Operations Center, with office space, that could be utilized by accelerator staff.

Finding #: F03	Priority:	Status: Closed	Scheduled Close: 10/8/2007	Actual Close: 10/7/2007
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Description: The committee is not fully convinced of the need of canting the damping wigglers and emphasizes the associated complexity.

Owner: John Hill

Action: Provide additional analysis and rationale to committee to support project position.

Response: It is desired to accommodate more than one beamline that views each damping wiggler straight section. For experimental programs that are flux-dependent rather than brightness-dependent, views of a single damping wiggler source, off-axis, are acceptable. For experimental programs that are brightness-dependent, however, there is a significant penalty paid by viewing the source off-axis. This is because the apparent source size significantly increases by viewing off-axis, according to the length of the insertion device multiplied by the inclination angle of the off-axis view. For realistic cases under consideration for experimental programs that prefer a damping wiggler source and are brightness-dependent, the penalty can be a factor of 20. For this reason, it is necessary to incorporate canted damping wiggler sources, in a damping wiggler straight section, if it is desired to accommodate two beamlines there instead of one, with each beamline upholding brightness-dependent experimental programs. In this circumstance, each beamline would view each of the canted damping wiggler sources on-axis. The penalty paid in this case is a factor of 2, and is due to having a damping wiggler source, for each beamline, that is a factor of 2 shorter than is otherwise possible. This is a smaller penalty than one that would be incurred through an off-axis view of a single long damping wiggler source.

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<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F04		Closed	10/8/2007	10/7/2007
<i>Description:</i> The committee takes note of the intention to subcontract the magnet and vacuum hardware of the booster to industry but emphasizes the responsibility of the project team in the system integration and recommends substantial involvement in the lattice, magnet and hardware design of the booster.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> None				
<i>Response:</i> The conceptual design for the booster system as well as a number of beam dynamics investigations and specification of tolerances has been performed by the design team. It is planned and budgeted to perform reviews for each completed stage of the turn key procurement as well as close monitoring of the production by NSLS-II design team.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F05		Closed	10/8/2007	10/7/2007
<i>Description:</i> The committee takes note that an overall unburdened and unescalated budget of 136 M\$ of capital spending on the accelerator system will still need to be revised in view of the changes made since the CD-1 Review. The committee believes that this budget is low compared to similar projects scaled to the size of NSLS-II.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Establish performance baseline in support of CD-2.				
<i>Response:</i> The revision of the cost estimate for CD-2 was completed in September 2007. Accelerator systems burdened cost went up from \$183M to \$250M.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F06		Open	10/8/2007	
<i>Description:</i> The committee is pleased with the reduced number of quadrupoles in the storage ring lattice and the increased portion of the circumference dedicated to Insertion Devices. The committee wonders whether it would not be of interest to accommodate two kinds of long straight sections. Some extra long would have high horizontal beta, one of which being reserved for injection. Some others would have reduced horizontal beta functions and would be ideally fitted with damping wigglers. Such a solution would not compromise the high symmetry of the lattice, though reducing it.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Develop a concept for implementing extra-long straight sections. Create an implementation plan, including a study of the implication on the performance of the accelerator, taking into account the reduction in ring symmetry.				
<i>Response:</i> A concept for implementing extra-long straight sections has been developed. An implementation is planned to be worked out as well as the study of the implication on the performance of the accelerator. A reduction of the ring symmetry is considered to be taken into account.				

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<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F07		Closed	10/8/2007	10/7/2007
<i>Description:</i> The committee is not convinced of the need of the 5th (or trim) quadrupole added in the center of the achromat. The committee takes note of the 10 families of sextupoles which look adequate in view of the large number of cells, but wonder if the number of sextupoles per cell (13) could be reduced. The committee believes that the lattice could be further optimized by rising the gradient in the quadrupole to 22 T/m and by bringing the first quadrupole closer to the bending magnet. As a result of such optimization the length available to insertion devices could be further increased.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Optimize the lattice design, taking into account the 5th quadrupole, the number of sextupoles, the gradient in the quadrupole, and the location of the first quadrupole to the bending magnet.				
<i>Response:</i> The center quadrupole has been removed from the lattice. The corresponding change of the baseline is being worked out in detail and should be completed by August 2007. In addition, the number of sextupole magnets per cell (half a superperiod) has been reduced to 10. Finally, further optimizations of the lattice are in progress. Several ways of increasing the space for user devices are being considered. The exchange of quadrupole and TPW position has been studied. The latter would imply technical complications. This is kept as an option and is not intended to be included in the baseline for the time being.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F08		Open	10/8/2007	
<i>Description:</i> The committee recognizes that the integration of the slow orbit correctors inside sextupoles, as done in many facilities, would enable to save space, but may introduce extra complications through the associated undesirable multipoles as well as the nonlinear crosstalk with the main sextupolar field. It recommends a detailed study of this point.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Consider performing a detailed study of the effects of the integration of the slow orbit correctors inside sextupoles.				
<i>Response:</i> The corrector integration into the sextupole magnet is considered to have technical difficulties. A detailed study is delayed due to higher priority items.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F09		Closed	10/8/2007	10/7/2007
<i>Description:</i> The committee recalls that the circumference of both the storage ring and booster need to be a highly factorable number multiplied by the RF wavelength.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Ensure that the circumference of the storage ring and booster are highly factorable multiples of the RF wavelength.				
<i>Response:</i> The RF frequency is 499.68 MHz. The harmonic number of the storage ring is 1320, for a length of 791.472 m. The harmonic number of the booster is 264, for a length of 158.944 m, which is 1/5 times the ring circumference. A ring harmonic number of 1320 is also particularly convenient for synchronization to mode-locked lasers.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F10		Open	10/8/2007	
<i>Description:</i> A 20 mm horizontal dynamic aperture at the injection point including insertion devices effects appears as a reasonable design goal. As a result, any options or tunings resulting in a shrinking of the dynamic aperture below 30 mm due to IDs or lattice errors should not be rejected (provided it is still above 20 mm). Similarly, the vertical dynamic aperture needed shall be equal to the physical aperture set by the ID gaps or vessel internal aperture.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Perform a study of the the aperture issues in the presence of insertion devices.				
<i>Response:</i> The aperture issues in presence of insertion devices are being carefully studied. This is a considerable effort over an extended time.				

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<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F11		Closed	10/8/2007	10/7/2007
<i>Description:</i> The committee is pleased with the experiment made in collaboration with SLS to control the non-linear lattice directly through the Lie Generator coefficient rather than through the sextupole currents of each families. The committee recommends continuing and deepening such studies which add understanding to the non-linear lattice, and give confidence in the modeling.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Perform further studies of the control of the non-linear lattice directly through the Lie Generator coefficient rather than through the sextupole currents of each families.				
<i>Response:</i> Further studies are in progress as recommended.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F12		Open	10/8/2007	
<i>Description:</i> The various methodologies developed world-wide to simulate insertion devices in tracking codes have been well identified. It appears that detailed studies of the effects of IDs on the beam are just about to start. Whichever method is used, the committee recommends comparing it with the kick map method which is easy to implement and allows fast tracking. The committee is skeptical about the use of the Halbach-type mode decomposition for the description of the elliptically polarized undulators. The method selected must be deeply connected with the 3D magnetic design of the insertion devices.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Consider comparison of selected method to simulate insertion devices in tracking codes, with the kick map method.				
<i>Response:</i> A first comparison between the kick method and Halbach method has already been done. It did not reveal significant differences. Further comparison is planned.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F13		Open	10/8/2007	
<i>Description:</i> The committee feels that the most urgent task in this area is to finalize the magnetic design of the damping wigglers and to ensure their transparency to the beam. The committee believes that the two main issues are the harmonic content along the beam axis and the sufficient horizontal width of the magnet assembly .				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Verify that the two main issues raised by the committee (harmonic content along the beam axis and the sufficient horizontal width of the magnet assembly) are adequately addressed in the ACD of the damping wigglers.				
<i>Response:</i> This is acknowledged by the team, but boundary conditions for the design are not yet sufficiently fixed to start engineering design. The plan is to do so and to have results in the fall.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F14		Open	10/8/2007	
<i>Description:</i> The committee is pleased with the injection tracking studies and recommends their continuation, including all insertion device effects and lattice errors.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Consider the continuation of injection tracking studies, including all insertion device effects and lattice errors.				
<i>Response:</i> This study is well underway.				

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<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F15		Open	10/8/2007	
<i>Description:</i> From experience elsewhere, the committee is not fully convinced that the present high beta straight for injection is long enough to accommodate injection equipment, and in particular is fully compatible with state of the art top-up requirements. In order to assess the adequacy of available space, an engineering layout of the injection straight of the storage ring should be generated. It is the feeling of the committee that a longer straight for injection could easily be accommodated in the lattice (see comments above).				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Consider performing additional analysis of the adequacy of available space, for injection equipment in the present high beta straight for injection.				
<i>Response:</i> A conceptual layout of the injection straight has been made. The required magnetic fields strengths and raise times for the fields are in a quite conventional range so that there seems to be no large technical challenge to fit it into the (enlarged) long straight section. The issue of flat top ripple and kicker-to-kicker variation and corresponding space requirements have not yet been addressed, though.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F16		Closed	10/8/2007	10/7/2007
<i>Description:</i> A possible operation at a 3.6 GeV energy was mentioned several times and the committee recalls that if NSLS-II intends to run at this energy, it should be included in the specifications of all systems such as magnets, absorbers, RF, Booster, and injection/extraction systems.				
<i>Owner:</i> Steve Dierker				
<i>Action:</i> Consider updating the specifications of all systems such as magnets, absorbers, RF, Booster, and injection/extraction systems, to include the possible operation of the NSLS-II at 3.6 GeV.				
<i>Response:</i> NSLS-II Project Management has decided to remove the possibility of operating at 3.6 GeV from the baseline design. Operation at up to only 3.0 GeV is intended and all components are being designed to meet this requirement. This decision was driven primarily by cost considerations.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F17		Open	10/8/2007	
<i>Description:</i> The committee recommends a horizontally movable septum magnet at the ring injection point in order to ease commissioning through a near on-axis injection configuration as well as to optimize the kicker currents in relation to the final horizontal aperture.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Request clarification from committee on this recommendation.				
<i>Response:</i> The idea behind this is not understood. The NSLS-II team requests clarification.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F18		Open	10/8/2007	
<i>Description:</i> The Australian Light Source booster lattice design which is used as a reference design for the proposed booster lattice presents the drawback of limited flexibility in the tunes. The committee recommends the investigation of solutions which increase the accessible tune range.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Consider performing an investigation of solutions for the proposed booster lattice which increase the accessible tune range.				
<i>Response:</i> A tuning and flexibility study is already being performed within limited human resources. Additional human resources are foreseen to complete this study.				

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<i>Finding #:</i> F19	<i>Priority:</i>	<i>Status:</i> Open	<i>Scheduled Close:</i> 10/8/2007	<i>Actual Close:</i>
<p><i>Description:</i> The proposed lattice for the booster synchrotron is pretty tight and the committee ask for an engineering layout in order to check that there is enough space for the correctors, diagnostics, vacuum pumps, etc. The committee recommends that the space required and the positioning of injection and extraction magnets inside the booster lattice be investigated (in particular the impact of the high value of the dispersion function in the injection and extraction straights has to be evaluated as well as the low beta values).</p> <p><i>Owner:</i> Ferdinand Willeke</p> <p><i>Action:</i> Provide an engineering layout to the committee. Also, investigate the space required and the positioning of injection and extraction magnets inside the booster lattice (in particular the impact of the high value of the dispersion function in the injection and extraction straights has to be evaluated as well as the low beta values).</p> <p><i>Response:</i> This is underway. Booster extraction studies are planned but not yet started because of limited resources.</p>				
<i>Finding #:</i> F20	<i>Priority:</i>	<i>Status:</i> Open	<i>Scheduled Close:</i> 10/8/2007	<i>Actual Close:</i>
<p><i>Description:</i> The committee notes that there is no definite requirement yet for hybrid filling modes, but nevertheless recommends including this capability from the outset, since a need is almost certain to arise in the future.</p> <p><i>Owner:</i> Ferdinand Willeke</p> <p><i>Action:</i> Consider the inclusion of a requirement for hybrid filling modes.</p> <p><i>Response:</i> There are solutions in preparation on the conceptual level to accommodate this mode of operation.</p>				
<i>Finding #:</i> F21	<i>Priority:</i>	<i>Status:</i> Open	<i>Scheduled Close:</i> 10/8/2007	<i>Actual Close:</i>
<p><i>Description:</i> Regarding the issue of whether or not to use a single power supply for all storage ring injection kicker magnets, the committee believes that there will inevitably be differences from kicker to kicker (due to mechanical tolerances, thickness of ceramic coating, etc.). So the committee recommends that individual power supplies be used in order to optimize the bump closure and hence minimize the disturbance of the stored beam, in view of top-up operation.</p> <p><i>Owner:</i> Ferdinand Willeke</p> <p><i>Action:</i> Consider the use of individual power supplies be used in order to optimize the bump closure and hence minimize the disturbance of the stored beam, in view of top-up operation.</p> <p><i>Response:</i> There are solutions in preparation on the conceptual level to accommodate this mode of operation.</p>				
<i>Finding #:</i> F22	<i>Priority:</i>	<i>Status:</i> Closed	<i>Scheduled Close:</i> 10/8/2008	<i>Actual Close:</i> 10/7/2007
<p><i>Description:</i> The project is considering two kinds of bending magnets for the storage ring in order to accommodate the large aperture required by the infrared beamlines. The committee believes that implementing two independent family power supplies is preferable for beam position stability compared to a single power supply with shunts or trim coils on the magnets.</p> <p><i>Owner:</i> Ferdinand Willeke</p> <p><i>Action:</i> Consider the use of independent family power supplies, if two kinds of bending magnets are utilized in the SR. Consider making this an agenda item at the upcoming Lattice Magnets Workshop and Magnet Power Supplies Workshop.</p> <p><i>Response:</i> All of the dipole magnets will be on the same bus but each dipole magnet has additional trim windings for correcting of any $\int B dl$-value outside the tolerance. 20 Trim circuits are in the baseline budget.</p>				

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<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F23		Closed	10/8/2007	10/7/2007
<i>Description:</i> The committee supports the recommendation of the stability workshop namely to use 20 bits (18 bits) resolution in driving the corrector dipoles (quadrupole) power supplies.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Consider implementing stability workshop recommendation to to use 20 bits (18 bits) resolution in driving the corrector dipoles (quadrupole) power supplies.				
<i>Response:</i> This is planned in the CD2- design update. The corrector stability resolution is costed assuming 18 bit in agreement with achievable stability limitations.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F24		Open	10/8/2007	
<i>Description:</i> The committee recalls some of the limitations when using Xray Beam Position Monitors (XBPM) : pollution by bending magnet radiation, gap dependence, sensitivity to the type of insertion device, offset from upstream aperture. One XBPM per beamline front-end is desirable to cross-check the stability of electron BPM. Two XBPMs may be a working solution in some cases but require a placement as far apart as possible. The committee fully supports the idea of organizing a workshop on XBPMs.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Consider organizing a workshop on XBPMs.				
<i>Response:</i> A workshop on XBPMs will be scheduled in the future.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F25		Closed	10/8/2007	10/7/2007
<i>Description:</i> Along these lines, implementation of the "Decker distortion" should be carefully considered. Use of ultraviolet radiation in a photon BPM design becomes feasible only with this lattice modification. This might also improve performance of any new hard x-ray BPM, by simplifying the radiation field patterns present in the beamline. The lattice modification is most easily included early in the design phase, and should have little impact on overall machine performances.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Consider implementation of the "Decker distortion".				
<i>Response:</i> Decker distortions should be possible in the present lattice. Specific design changes have been made for the straight sections which support planned and costed beam lines.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F26		Closed	10/8/2007	10/7/2007
<i>Description:</i> It is the opinion of the committee that the proposed vibrating stretched wire set-up for aligning the quadrupoles and sextupoles on a girder has a lot of potential. A major difficulty is the large value of the sag which requires measurement and compensation. Local wire defects may introduce offsets along the wire. The committee recommends a deep study on this as early as possible in order to eliminate systematic and random errors. The committee also asks to investigate the accuracy that could be achieved by using this wire technique to correctly position the magnets roll angle (source of coupling of the beam through the associated skew quadrupole) .				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Consider commissioning a study of the vibrating wire alignment technique to determine and eliminate systematic and random errors, and also to investigate the accuracy that could be achieved to position the magnets roll angle.				
<i>Response:</i> The sag of the wire, its temperature dependence, its dependence of the stress, its variance due to material in homogeneity is well being considered in the planned layout and in the tests being performed.				

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<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F27		Open	10/8/2007	
<i>Description:</i> The proposed girder fixation on the floor is simple but should be experimentally tested using a prototype girder as soon as possible, to determine ease and accuracy of alignment, as well as performance in terms of vibrations, reaction to thermal changes etc.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Consider performing an R&D study of girder fixation on the floor, to determine ease and accuracy of alignment, as well as performance in terms of vibrations, reaction to thermal changes etc.				
<i>Response:</i> An R&D study of girder fixation on the floor is planned.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F28		Open	10/8/2007	
<i>Description:</i> Beware of a possible perturbation of the BPM signals by TE modes excited by the beam inside the chamber and antechamber (reported by APS). Beware also of the initial large offsets of the BPM readings on day one (reported by APS), that requires BBA to be done very early.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Consider researching committee concerns (reported by APS).				
<i>Response:</i> Thorough impedance assessment of the BPM is planned as part of the technical layout. Also, electrical testing of the monitor signals is planned as part of the design.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F29		Closed	10/8/2007	10/7/2007
<i>Description:</i> The committee was surprised by the estimated low pressure reported at the damping wiggler absorber. The graphs presented should give information on the condition of computation (accumulated dose, degassing coefficient etc.). The committee recalled that copper absorbers re-emit about 10 % of the incident power (as a rule of thumb) by fluorescence and scattering, that contributes to outgassing of the surrounding aluminum vessels.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Confirm calculation of the estimated low pressure reported at the damping wiggler absorber.				
<i>Response:</i> The gas load as a result of high radiation load with photo and thermal desorption is considered including scattered radiation.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F30		Closed	10/8/2007	10/7/2007
<i>Description:</i> A mirror is intended to be placed inside the bending magnet chamber to collect infrared radiation. This mirror should be safe under possible large closed-orbit distortions that will take place during machine studies. Water cooling also brings vibrations which are known to be a problem on many infrared beamlines.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Consider performing analysis of placement of mirror in bending magnet chamber; as well as water cooling-induced vibrations on IR beamlines.				
<i>Response:</i> This problem is planned to be solved by a slotted mirror design.				

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Finding #: F31	Priority:	Status: Closed	Scheduled Close: 10/8/2007	Actual Close: 10/7/2007
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Description: In relation to the preliminary design of the front-ends, the committee believes that starting the front-end with a manual interlocked gate valve, followed by a simple fixed bending magnet radiation absorber, is in the end a cheaper solution (adopted by Soleil, Diamond, ESRF,...).

Owner: Ferdinand Willeke

Action: Consider committee recommendation regarding preliminary design of the front-ends.

Response: The project team came to the conclusion that a remotely operated, interlocked, slow gate valve between the storage ring and the front end, in conjunction with a single fast gate valve in the middle of the front end, is an optimum solution.

Finding #: F32	Priority:	Status: Open	Scheduled Close: 10/8/2007	Actual Close:
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Description: The field specifications of the damping wiggler should be finalized urgently in connection with its effect on the beam dynamics (see above) .

Owner: Ferdinand Willeke

Action: Verify that committee concerns regarding field specifications are adequately addressed in the ACD of the damping wiggler.

Response: This is on ongoing process and a moving target.

Finding #: F33	Priority:	Status: Closed	Scheduled Close: 10/8/2007	Actual Close: 10/7/2007
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Description: The possible crosstalk of field integral between the three pole wiggler and the adjacent bending magnet should be studied and if needed an active or preferably passive compensation should be worked out.

Owner: Ferdinand Willeke

Action: Consider performing study of crosstalk of field integral between the three pole wiggler and the adjacent bending magnet.

Response: Some studies have been done. The interference is finite, but it should be mediatable with small trim current on the dipole.

Finding #: F34	Priority:	Status: Closed	Scheduled Close: 10/8/2007	Actual Close: 10/7/2007
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Description: Cryogenic permanent magnet undulators are a step forward in terms of peak field from in-vacuum undulators which come with additional construction costs. Significant engineering effort is required in this direction.

Owner: Ferdinand Willeke

Action: Perform advanced conceptual design and prototyping of CPMU.

Response: NSLS-II Management agrees that CPMUs have potential to achieve higher peak field and that realizing this potential would require significant additional engineering and construction costs. Furthermore, the project feels that the potential gains are quite limited unless new permanent magnet materials with higher remnant and coercive fields were available. An R&D program to develop such materials is considered to fall outside the scope of a construction project. Efforts will be made to pursue R&D in this area through non-project means. Without new materials, the limited performance gains of CPMUs are not considered sufficient justification for the additional risk, effort, and cost that they would entail. Therefore, the baseline hard x-ray undulator design for NSLS-II has been changed to use room temperature in-vacuum undulator technology.

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<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F35		Closed	10/8/2007	10/7/2007
<i>Description:</i> The committee supports the need for a proper insertion device laboratory that is compatible with the R & D needed and should include a clean room and temperature stabilization.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Confirm needs for insertion device laboratory, including a clean room and temperature stabilization.				
<i>Response:</i> A clean room and temperature stabilization are planned.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F36		Closed	10/8/2007	10/7/2007
<i>Description:</i> The committee would like to understand the impact on the machine operation of declaring the tunnel roof, where all the power supplies and electronic cubicles are located, as a "no full-time occupancy area".				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Consider the impact on the machine operation of declaring the tunnel roof, where all the power supplies and electronic cubicles are located, as a "no full-time occupancy area".				
<i>Response:</i> A Shielding Policy has been prepared to guide radiation calculations and future operations. The design objective is to reduce radiation levels outside NSLS-II shielding in areas of continuous occupational occupancy (2000 hours per year) below an average of 0.5 mrem per hour at shielding wall surface contact and as far below this average as is reasonably achievable. This design criterion is consistent with DOE design requirements specified in 10 CFR Part 835.1003.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F37		Closed	10/8/2007	10/7/2007
<i>Description:</i> The committee recommends that detailed analysis of the radiation protection issues associated with top-up operation be started soon. While it may seem apparent that the primary failure mechanism, namely a shorted main bending magnet, is incompatible with stored beam, it is a nontrivial exercise to prove this for partially shorted magnets, e.g. shorted turns. For example, reverse particle tracking through beamline front ends and periodic validation of the location of certain accelerator components is required at the APS for top-up personnel safety. Top-up operation at the ALS has been delayed by the complexity of this type of study.				
<i>Owner:</i> Steve Dierker				
<i>Action:</i> Consider issues raised by committee concerning the analysis of radiation issues associated with top-up operation, and verify that current schedule for this analysis supports overall project schedule and milestones.				
<i>Response:</i> The NSLS-II team is aware of the problem and the amount of work to be done to provide sufficient back-up for the planned safety measures. Corresponding effort has been included in the work plan and the cost estimate.				
<i>Finding #:</i>	<i>Priority:</i>	<i>Status:</i>	<i>Scheduled Close:</i>	<i>Actual Close:</i>
F38		Open	10/8/2007	
<i>Description:</i> The committee takes note that a future upgrade into a 15 m long straight section could double the flux and brightness for selected beamlines but believe that such a break of the lattice symmetry could impact the operation of all the other beamlines. It is also not convinced that there are many beamlines whose performance is critically determined by a factor of two improvement in flux. The committee re-iterates its opinion that it would be preferable to design the ring with a few longer straight sections from the very beginning.				
<i>Owner:</i> Ferdinand Willeke				
<i>Action:</i> Consider committee concerns regarding the impact of future upgrade of 15 m long straight section on other beamlines.				
<i>Response:</i> Extra long straights are being considered to be implemented in the design in a way which preserves high symmetry. The corresponding lattice changes are based on the footprint of a 15-fold lattice. Final decision to build extra long straights into the initial lattice will depend on further evidence of their usefulness, the assessment of the technical difficulties of the extra long insertion devices, clear design criteria for the lattice and the beam optics from photon science on compatibility with high performance of the NSLS-II storage ring.				

Review Tracking Report (Cont.)

Finding #: F39	Priority:	Status: Closed	Scheduled Close: 10/8/2007	Actual Close: 10/7/2007
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Description: The committee would like to have more details on the followings items for the next meetings of ASAC:

- o Magnets (design, specification, strategy of procurement, measurement) of dipoles, quadrupoles, sextupoles and correctors
- o Closed orbit correction, including feedback
- o More detailed presentation on front-end layout in general with a particular attention to all absorber design downstream the damping wigglers
- o Diagnostics on Linac, transfer line, booster, storage ring and active machine protection system
- o Control system

Owner: Ferdinand Willeke

Action: Provide additional details on the following items for the next ASAC meeting:

- Magnets (design, specification, strategy of procurement, measurement) of dipoles, quadrupoles, sextupoles and correctors
- o Closed orbit correction, including feedback
- o More detailed presentation on front-end layout in general with a particular attention to all absorber design downstream the damping wigglers
- o Diagnostics on Linac, transfer line, booster, storage ring and active machine protection system
- o Control system

Response: Additional details for requested items to be provided at the next meeting.